

West Nile Virus - Illinois Department of Public Health

January 23, 2003

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Memorandum

Date: January 23, 2003
To: Municipal Governments and Local Health Departments
Re: Mosquito Control and Prevention of West Nile Viral Encephalitis
From: Linn David Haramis, Ph.D., Entomologist / Vector Control Program Manager
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During 2002, there was an outbreak of West Nile viral encephalitis in Illinois with more than 800 cases and more than 50 deaths. The appearance of West Nile virus (WNV) cases in Illinois resulted in local health departments expending many staff-hours responding to inquiries by concerned citizens. Additionally, there was intense interest in the issue by citizens and the news media. In response to the 2002 outbreak, many communities conducted or enhanced mosquito control operations. Anecdotally, areas in Cook County that had existing mosquito control programs with especially intensive mosquito **LARVICIDING** efforts had fewer human cases than those areas that had less intensive larviciding efforts or no larviciding at all.

We do not know how Illinois will be impacted by WNV during 2003. Although emergency funding was made available in Illinois in 2002, there are no guarantees that similar funding will be available this year. Consequently, local municipalities and mosquito abatement districts need to plan and budget for adequate mosquito control measures.

Because of concern about possible WNV activity in 2003, it is likely that some communities will begin or increase mosquito control programs this year. Consequently, Department staff believe that local governments that conduct mosquito control programs should emphasize the methods that are most effective at controlling the primary mosquito vectors (carriers) of WNV and a related disease, St. Louis encephalitis virus. Additional information about WNV and mosquito control may be found on the Department's web site: <

<http://www.idph.state.il.us/envhealth/wnv.htm> > and the other web sites listed below.

Please be aware that all personnel who do pesticide applications for mosquito pest control must be licensed by the Illinois Department of Agriculture (IDA). The only exceptions are if one treats one's own residential property for mosquitoes and for certain insecticides used by tire recycling companies to treat water-filled used tires. Please contact the IDA at 217-785-2427 for more information about mosquito control licensing.

Control of the West Nile Virus Mosquito Vector

Control of *Culex* Larvae is a Priority: Although WNV has been detected in several species of mosquitoes, about 70% of the positive samples have been from *Culex pipiens* (the house mosquito) and related species of *Culex*. The house mosquito breeds most prolifically in stagnant water that has a heavy organic content. In urban areas, catch basins, artificial water-filled containers like used tires and poorly draining ditches are common production sites for *Culex* mosquitoes. Additionally, ***most of the house mosquitoes present in a community were produced locally*** because the house mosquito does not fly more than about 1 to 2 miles from its production site. In contrast, the inland floodwater mosquito (*Aedes vexans*) can fly 10 or more miles from where they hatch, particularly along prevailing winds. Although floodwater mosquitoes can be a nuisance to the public when they are abundant, they have not been significant disease carriers in Illinois and are currently believed to be minor carriers of WNV.

The most effective method of mosquito control is "larviciding" or the treatment of locations where mosquito larvae are present such as the water impounded in the bottom of "catch basins" (storm drains). Catch basins may be found along streets, in parking lots and sometimes in backyards. Because catch basins are a major source of the house mosquito in urban areas, the Department recommends that catch basins be treated at least twice during the summer to control *Culex* mosquitoes. Ideally, municipalities should treat catch basins and other locations that produce *Culex* mosquitoes as often as determined by necessary inspection and according to insecticide label directions. However, ***a minimum response*** by a municipality would be to treat catch basins and other *Culex* production sites twice during the summer (June and July). (Please see Table 1 for a list of mosquito larvicides.) This would reduce numbers of ***vector*** mosquitoes during late summer, the period of greatest risk to humans. We recommend that local officials review the references about mosquito control found in Table 2, particularly the *CDC /USEPA Joint Statement on Mosquito Control and Integrated Methods of Mosquito Control*.

Spraying for Adult Mosquitoes: Adult mosquito control (also called "fogging," "spraying" or "adulticiding") is the method of mosquito control that is most familiar to the public. However, the aerosol fog kills only mosquitoes that contact insecticide droplets; the fog soon dissipates. Although the local mosquito population is reduced for a few days, fogging does not prevent mosquitoes from re-entering the area. Because only a part of the local adult mosquito population is reduced only for a few days by fogging, municipalities should give priority to larval mosquito control of *Culex* mosquitoes. Nonetheless, when the risk of human disease is present, the only method that will reduce the population of ***WNV-infected*** mosquitoes throughout a community is adulticiding. Treatment for control of WNV-infected adult mosquitoes is a valid and legal option for local officials to employ as a supplement to larviciding.*

However, every effort should be made to inform the public when treatment for adult mosquitoes is planned. An informed public will better understand the measures being taken and will be able to take precautions to limit their exposure to pesticides.

Nonchemical Mosquito Control: Mosquito larvae or "wigglers" must live in still water for five or more days to complete their growth before changing into adult biting mosquitoes capable of transmitting disease. Often, the number of mosquitoes in an area can be reduced by removing sources of standing water around residences. For example, hundreds of mosquitoes can come from a single discarded tire. Local agencies should inform the public how to prevent mosquito production around residences and prevent mosquito bites:

1. Get rid of old tires, tin cans, buckets, drums, bottles or any water-holding containers.
2. Fill in or drain any low places (puddles, ruts, etc.) in the yard.
3. Keep drains, ditches, and culverts free of weeds and trash so water will drain properly.
4. Keep roof gutters free of leaves and other debris.
5. Cover trash containers to keep out rainwater.
6. Repair leaky pipes and outside faucets.
7. Empty plastic wading pools at least once a week and store indoors when not in use. Unused swimming pools should be drained and kept dry during the mosquito season.
8. Fill in tree rot holes and hollow stumps that hold water.
9. Change the water in birdbaths and plant pots or drip trays at least once each week.
10. Store boats covered or upside down, or remove rainwater weekly.
11. Keep grass cut short and shrubbery well trimmed around the house so adult mosquitoes will not hide there.
12. 12. Make sure ornamental ponds have fish, which will eat mosquito larvae.
13. 13. Repair window screens.
14. 14. When outdoors in the evening or when mosquitoes are biting, use personal protection measures to prevent mosquito bites (proper use of insect repellent and appropriate clothing). See the Department's web site for specific personal protection recommendations.

In summary, local agencies that conduct mosquito control should give highest priority to eliminating breeding sites and larviciding. Elimination and treatment of *Culex* mosquito production sites will help municipalities protect Illinois citizens from mosquito-borne West Nile virus.

*Fogging for adult mosquitoes should ONLY be conducted at the proper time (evening or early morning) and under appropriate environmental conditions (such as temperatures from 60 to 85 degrees Fahrenheit and low wind speeds). For ultra-low volume (ULV) spraying units to control mosquitoes, they MUST be serviced so they produce a proper droplet size spectrum. Please consult the pesticide label and manufacturer's recommendations for further information.

Table 1. Mosquito Larvicides Commonly Used in Illinois¹

Note: Mosquito larvicides with methoprene or *Bacillus sphaericus* as the active ingredient have been found to be particularly effective for control of *Culex* mosquito larvae in catch basins.

<i>Larvicide</i>	<i>Type</i>	<i>Action</i>	<i>Primary Use</i>
Abate ^R (Temephos)	Organophosphate	Directly toxic	Tires, Containers, floodwater sites
Altosid ^R (Methoprene)	Growth regulator	Prevents larvae from developing to adults	Catch basins, containers, floodwater sites
<i>Bacillus thuringiensis israelensis</i> (Bti)	Bacterial	Gut toxin	Floodwater, catch basins
<i>Bacillus sphaericus</i> (Bs)	Bacterial	Gut toxin	Catch basins, septic waters (for <i>Culex</i>)
Oils (Golden Bear ^R & BVA ^R) ^{2,3}	Surface treatment	Suffocation: film covers air tubes of larvae	Floodwater, catch basins, septic waters

¹ Always read and follow all current pesticide label instructions. If any information in these recommendations disagrees with the pesticide label, the label instructions must be followed. Use of a product name does not constitute product endorsement. All pesticides must be registered with USEPA and the IDA.

² Monomolecular film larvicide (Agnique^R, an alcohol-derived product) that acts like an oil larvicide has become available recently.

³ All oils used as larvicides must be registered with USEPA and the IDA.

Table 2. Mosquito Control References

Agency	Title	Web Site Address
IDPH	West Nile Virus Web Site	http://www.idph.state.il.us/envhealth/wnvrepel.htm
	Mosquitoes	http://www.idph.state.il.us/public/hb/hbmosquito.htm
	Prepared News Releases about Mosquito Prevention (PDF file)	http://www.idph.state.il.us/envhealth/pdf/mosquito-borne01.pdf
	Questions and Answers about Mosquito Prevention for People, Property and Pets	http://www.idph.state.il.us/envhealth/factsheets/psreduction.htm
	Questions and Answers about Spraying for Adult Mosquitoes	http://www.idph.state.il.us/envhealth/factsheets/fog.htm
IDPH & CDC	DEET Insect Repellents	http://www.idph.state.il.us/envhealth/deetfacts.htm http://www.cdc.gov/ncidod/dvbid/westnile/ga/insect_repellent.htm http://www.epa.gov/pesticides/citizens/mosquitojoint.htm
CDC and USEPA	CDC / US EPA Joint Statement on Mosquito Control	
	Pesticides and Public Health: Integrated Methods of Mosquito Management	http://www.cdc.gov/ncidod/eid/vol7no1/rose.htm
USEPA	Pesticides and Mosquito Control	http://www.epa.gov/pesticides/citizens/pmcs.pdf http://www.epa.gov/pesticides/factsheets/skeeters.htm
	Using Insect Repellents Safely	http://www.epa.gov/pesticides/citizens/insectrp.htm
	Larvicides for Mosquito Control	http://www.epa.gov/pesticides/citizens/larvfs.pdf http://www.epa.gov/pesticides/citizens/larvicides4mosquitos.htm
	Synthetic Pyrethroids for Mosquito Control	http://www.epa.gov/pesticides/citizens/synpyfs.pdf http://www.epa.gov/pesticides/citizens/pyrethroids4mosquitos.htm
University of Illinois Extension	Community Mosquito Management	http://ipm.uiuc.edu/publications/infosheets/105-mosquito/cmm.html
Rutgers University, NJ	Products and Promotions that have Limited Value for Mosquito Control	http://www-rci.rutgers.edu/~insects/propprom.htm